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UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for new nonprovisional applications under 37 CFR 1.53(b))</small>	Attorney Docket No.	00-93	Total Pages
	First Named Inventor or Application Identifier		
	Gilles L. Letourneau		
	Express Mail Label No.	EL291412684US	

APPLICATION ELEMENTS <small>See MPEP chapter 600 concerning utility patent application contents.</small>	ADDRESS TO: <small>Box Patent Application Washington, DC 20231</small>
<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form <i>(Submit an original, and a duplicate for fee processing)</i></p> <p>2. <input checked="" type="checkbox"/> Specification [Total Pages 16] <i>(preferred arrangement set forth below)</i></p> <ul style="list-style-type: none">- Descriptive title of the Invention- Cross References to Related Applications- Statement Regarding Fed sponsored R & D- Reference to Microfiche Appendix- Background of the Invention- Brief Summary of the Invention- Brief Description of the Drawings <i>(if filed)</i>- Detailed Description- Claim(s)- Abstract of the Disclosure <p>3. <input checked="" type="checkbox"/> Drawing(s) (35 USC 113) [Total Sheets 7]</p> <p>4. Oath or Declaration [Total Pages 3]</p> <ul style="list-style-type: none">a. <input checked="" type="checkbox"/> Newly executed (original or copy)b. <input type="checkbox"/> Copy from a prior application (37 CFR 1.63(d)) <i>(for continuation/divisional with Box 17 completed)</i> <i>[Note Box 5 below]</i>i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). <p>5. <input type="checkbox"/> Incorporation By Reference <i>(useable if Box 4b is checked)</i> The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.</p>	<p>6. <input type="checkbox"/> Microfiche Computer Program <i>(Appendix)</i></p> <p>7. Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, all necessary)</i></p> <ul style="list-style-type: none">a. <input type="checkbox"/> Computer Readable Copyb. <input type="checkbox"/> Paper Copy (identical to computer copy)c. <input type="checkbox"/> Statement verifying identity of above copies
ACCOMPANYING APPLICATION PARTS	
<p>8. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s))</p> <p>9. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <i>(when there is an assignee)</i></p> <p>10. <input type="checkbox"/> English Translation Document <i>(if applicable)</i></p> <p>11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations</p> <p>12. <input type="checkbox"/> Preliminary Amendment</p> <p>13. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i></p> <p>14. <input checked="" type="checkbox"/> Small Entity Statement filed in prior application, Status still proper and desired</p> <p>15. <input type="checkbox"/> Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i></p> <p>16. <input type="checkbox"/> Other: _____</p>	

17. If a **CONTINUING APPLICATION**, check appropriate box and supply the requisite information:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____

18. CORRESPONDENCE ADDRESS					
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FEE TRANSMITTAL for FY 2001

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TOTAL AMOUNT OF PAYMENT (\$) 395.00

Complete if Known

Application Number	
Filing Date	
First Named Inventor	Gilles L. Letourneau
Examiner Name	
Group Art Unit	
Attorney Docket No.	00-93

METHOD OF PAYMENT

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

Deposit Account Number 501517

Deposit Account Name Thomas L. Bohan & Associates

☒ Charge Any Additional Fee Required Under 37 CFR 1.16 and 1.17

☐ Applicant claims small entity status. See 37 CFR 1.27

2. ☒ Payment Enclosed:

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid		
101	710	201	355	Utility filing fee	355
106	320	206	160	Design filing fee	
107	490	207	245	Plant filing fee	
108	710	208	355	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) (\$) 355.00

2. EXTRA CLAIM FEES

Total Claims	Extra Claims	Fee from below	Fee Paid
6	-20** =	X	
1	-3** =	X	
Independent Claims			
Multiple Dependent			

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description		
103	18	203	9	Claims in excess of 20
102	80	202	40	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim, if not paid
109	80	209	40	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code (\$)	Small Entity Fee Code (\$)	Fee Description	Fee Paid		
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for ex parte reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	390	216	195	Extension for reply within second month	
117	890	217	445	Extension for reply within third month	
118	1,390	218	695	Extension for reply within fourth month	
128	1,890	228	945	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,240	241	620	Petition to revive - unintentional	
142	1,240	242	620	Utility issue fee (or reissue)	
143	440	243	220	Design issue fee	
144	600	244	300	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	40
146	710	246	355	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	710	249	355	For each additional invention to be examined (37 CFR § 1.129(b))	
179	710	279	355	Request for Continued Examination (RCE)	
169	900	169	900	Request for expedited examination of a design application	

Other fee (specify) _____

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 40.00

SUBMITTED BY

Name (Print/Type)	Patricia M. Mathers	Registration No. (Attorney/Agent)	44,906	Telephone	(207) 773-3132
Signature	Patricia Mathers	Date	11/10/2000		

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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c))--SMALL BUSINESS CONCERN	Docket Number (Optional) 00-93
Applicant, Patentee, or Identifier: <u>Gilles L. Letourneau</u> Application or Patent No.: _____ Filed or Issued: _____ Title: <u>Method of Automatically Generating Specifications and Providing Online Services for Same</u>	
I hereby state that I am <input type="checkbox"/> the owner of the small business concern identified below: <input checked="" type="checkbox"/> an official of the small business concern empowered to act on behalf of the concern identified below:	
NAME OF SMALL BUSINESS CONCERN <u>InterSpec, LLC</u>	
ADDRESS OF SMALL BUSINESS CONCERN <u>100 Commercial Street, Suite 417</u> <u>Portland, Maine 04101</u>	
<p>I hereby state that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.</p> <p>I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:</p> <p><input checked="" type="checkbox"/> the specification filed herewith with title as listed above. <input type="checkbox"/> the application identified above. <input type="checkbox"/> the patent identified above.</p> <p>If the rights held by the above identified small business concern are not exclusive, each individual, concern, or organization having rights in the invention must file separate statements as to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).</p> <p>Each person, concern, or organization having any rights in the invention is listed below: <input checked="" type="checkbox"/> no such person, concern, or organization exists. <input type="checkbox"/> each such person, concern, or organization is listed below.</p> <p>Separate statements are required from each named person, concern or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)</p> <p>I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))</p>	
NAME OF PERSON SIGNING <u>Michael Brennan</u>	
TITLE OF PERSON IF OTHER THAN OWNER <u>Manager</u>	
ADDRESS OF PERSON SIGNING <u>InterSpec, LLC</u> <u>100 Commercial St Suite 417</u> <u>Portland, ME 04101</u>	
SIGNATURE <u>[Signature]</u> DATE <u>11/10/00</u>	

METHOD OF AUTOMATICALLY GENERATING SPECIFICATIONS AND PROVIDING ONLINE SERVICES FOR SAME

BACKGROUND INFORMATION

1. Field of the Invention

5 The invention relates to field of specification writing. More particularly, the invention relates to a method of automatically generating a technical specification based on information for a construction project. More particularly yet, the invention relates to such a method that automatically generates specifications from information on drawings and provides specification-writing services.

10 2. Description of the Prior Art

15 A set of architectural drawings for a construction project contains not only information pertaining to the dimensions and layout of a building and/or site, but also information on the various elements and materials called for in the project. Brief references to these elements and materials are included in so-called "calloffs" on the drawing. Examples of such "calloffs" are *roof windows*, *aluminum windows*, *brick siding*, *brick pavers on sand*, etc., as can be seen in FIG. 1A. Information relating to the materials to be used, installation and/or inspection procedures, etc. for these calloffs are then specified in detail in the project specification, a separate document. Generally, this information is taken from a standard specification library that includes the specifications for all products or elements admissible for use in a project constructed according to certain industry standards. Thus, for example, the American Institute of Architects (AIA) has a library of construction specifications, as do the Construction Science Research Foundation and numerous commercial, private, and government organizations.

25 In the conventional specification-writing process, a specification writer goes through the drawings, notes each calloff on the drawings, and then compiles a complete project specification by gathering and editing the specifications from the specification library for all calloffs in the drawings. Understandably, generating the complete project specification for a construction

project can be a very time-consuming process. Literally hundreds of individual products or elements may be called for in a project, resulting in a compilation of hundreds of individual specifications. Each specification for a particular element will include the specifications for the various types of the particular element. For example, the specification for *unit pavers* will include the specifications for all types of unit pavers, such as *brick, stone, asphalt, and concrete*, including the type of substrate used with the pavers, if applicable. The specification writer, when writing the project specification, will then painstakingly cross out or delete the many paragraphs that refer to elements other than the particular type of paver called for in the drawing. If the calloff is *brick paving*, the paragraphs relevant to asphalt, stone and concrete pavers will be deleted.

Over the years, efforts at automating the specification process have been undertaken, but have generally met with little success because they typically require that all users of the automated process restrict the terms used in the calloffs to the terms in an approved glossary. This restriction has proven to be difficult for the industry to accept.

Nevertheless, the recent advances in electronic data management technology and telecommunications have provided many tools that can be used to streamline and simplify the standardization process. For example, many commercial, industrial, and government organizations or groups, including the AIA and the U.S. government have compiled their respective library of specifications into standardized base documents in word-processable formats which are downloadable via the Internet or other means. Furthermore, most drawings for construction projects are generated today with the use of a computer-aided drawing (CAD) software. One of the advantages provided by the CAD software is that the calloffs on the drawing are electronically readable. It would be a great advantage to architects, general contractors, and other entities in the construction industry to be able to automatically generate a project specification by taking the calloff data directly from the CAD drawing and linking that data with the relevant electronic base document to generate a project specification that contains the relevant specifications for the particular project and does not contain extraneous information.

It is also the case that construction projects are often very complex projects, with many firms participating in the planning and construction phases. It would be a great advantage to such firms if the project specification could be generated online in a collaborative process, wherein the

project specification would be available online for viewing and editing and the many participating firms could provide information that would then also be immediately available online to all project participants.

Prior art discloses software that scans a CAD drawing, retrieves information from the drawing, and puts it in spreadsheet form. EXCELLINK offered by CAD Studio is such software. Another firm, BSD SpecLink, provides stand-alone software that allows a client to fill out a checklist and generate a specification based on a BSD specification. Despite the recent technological advances, it has not yet been possible to automatically generate a project specification and have it immediately available online for project participants. It has also not been possible to automatically generate a project specification from calloffs on a CAD drawing, nor has it been possible for a client or user at a remote location to amend or supplement a project specification online during an editing phase.

What is needed, therefore, is a method of automatically generating a specification for the various elements or products required in a construction project and providing users at one or more remote locations with immediate online access to the project specification. What is further needed is such a method that will allow the automatically-generated specification to be viewed and edited online, in real-time, in a collaborative process. What is yet further needed is such a method that automatically generates a project specification from calloffs on a CAD drawing or from an online checklist.

SUMMARY OF THE INVENTION

For the above-cited reasons, it is an object of the present invention to provide a method of automatically generating specifications for construction projects. It is a further object of the invention to provide such a method according to which the information for a construction project can be automatically scanned from a CAD-drawing. It is a yet further object to provide such a method that will allow a collaborative online process between participating parties in generating, viewing and editing the project specification.

These objects are achieved by providing a method of converting construction project information to user tags in a database, mapping the user tags to relevant paragraphs of a base document and merging the user tags and mapping information with the base document to automatically generate an editable project specification. The method according to the invention uses Simple Query Language (SQL) to interface with a relational database management system for organizing the construction project information and mapping it to base documents or master documents that are stored in a document management database. The relational database is specific to the particular base document and basically contains data that allows the information called for in a construction project to be mapped to specific paragraphs in the base document. When the relational database and the base document are merged, only those paragraphs relevant to the specific project are turned on, that is, all irrelevant paragraphs are crossed out. For reasons of efficiency, the relational database is organized as a plurality of tables that can be joined or linked with one another to provide the relevant information for a specific project, a specific client, etc. It is, of course, possible to organize the data in other configurations, such as in one large table, or in many smaller tables. Thus, although reference will be made to various tables in the following description of the invention, it is not necessary that the database be so organized as shown in the illustrations.

The method of automatically generating a project specification from a base document includes a number of preparatory steps, the two major steps of which are creating a glossary of “system default tags” for that base document and mapping the system default tags to the particular sections and paragraphs in the particular base document. In the method according to the invention, “system default tags” are the terms used in the base document. Each term for a product or element, for example, is defined as a system default tag and assigned a “TAG-ID”, and also a “PARENT-ID” which provides a parent/child link between paragraphs and sub-paragraphs. The mapping function counts the paragraphs in each section in the base documents and assigns a sequential number to each paragraph in a particular section. This paragraph number is used to link each paragraph to the particular section and paragraph in the base document. Once the system default tags have been defined and the base document mapped, “user tags”, *i.e.*, those terms that a client uses, can be associated with the system default tags and thereby mapped to the relevant section, paragraphs and sub-paragraphs.

In the Preferred Embodiment of the method according to the invention, the calloff data from a CAD drawing is loaded into the relational database table and also into a conventional CAD viewer for simultaneously viewing on a computer monitor. The calloffs on the drawing are presented as they appear on the drawing and also in a calloff list on the screen. The link to the calloff list, referred to hereinafter as a calloff- link, is based on an algorithm that converts the X/Y world coordinates of items in the CAD drawing to the pixel coordinates of the computer screen. Thus, as the viewer pans or zooms in on a portion of the CAD drawing, only those calloffs that are included within the area shown on the viewer are presented in the calloff list. The drawing mapping function then searches a dictionary to determine if the calloff is a "known" or "previously scanned" calloff, that is, either corresponds to a system default tag or has been associated with one. If the calloff is found in the dictionary, it is identified as a known tag. If the calloff is not found, the drawing mapping function next searches an ignore bin to see if the calloff has been identified as one to be ignored in project specifications. If this is the case, the calloff is identified in the calloff list as an ignore tag. Calloffs that are not found in the dictionary or ignore bin are identified as unscanned calloffs. The specification writer can now decide whether the calloff is to be ignored, or is relevant to the project specification. If relevant, the specification writer goes through a process of searching the base documents with a full-text search to determine if the particular unscanned calloff or a term similar to it appears in the document and in which sections. If the calloff is found, the specification writer works through a decision process to determine whether the calloff is found in an appropriate section and paragraph, and if it is, it is associated with the system default tag in that section and paragraph. If the calloff is not found, the specification writer must then determine what the appropriate system default tag is, enter the calloff as a user tag in the relational database, and associate it with the appropriate system default tag. In this process, the specification writer has an opportunity to determine that the user tag be associated with the system default tag for this particular project only, for this particular client only, or for general use.

When all calloffs on the CAD drawing have been converted to user tags or defined as ignore tags, the project specification is automatically generated by merging the relational database with base documents or default master documents stored in the document management database. The relational database selects all the user tags that are defined specifically for the project or are tags that are applied to all project specifications. The user tags are then mapped to the relevant

paragraphs of the base document and, when the base document is merged with the relational database and sent to the document editor, all paragraphs that are irrelevant, *i.e.*, that were not mapped, appear as crossed-out paragraphs. This process of “turning on” relevant paragraphs and “turning off” irrelevant paragraphs can be done in a number of ways. For example, whether base documents is stored with all paragraphs initially crossed-out and with the relevant paragraphs “turned on” when the base document is merged with the relational database, or the document is stored with all paragraphs “on”, and, when merged with the relational database, the irrelevant paragraphs are turned off, will depend on which process is more efficient.

After the specification is sent to the editor, it can be accessed from remote locations via the Internet by all participants of the construction project who have access to the particular client account. The participant can communicate with the specification writer and with other participating parties by including notes or remarks in a project notes database provided within the client account.

In an alternative embodiment of the invention, the drawing itself is not scanned into a file, but rather construction project information is entered into a checklist that is provided online. The process of associating user tags with system default tags is eliminated in this embodiment, as the checklist provides the tags used in the project specification and the client selects the applicable tag. The client can decide to associate the particular checklist item with the current project only or to bind it for all future projects of the particular client, for example, for paragraphs that appear typically in all project specifications. The steps of generating the client project specification by merging the relational database, which now uses the user tags defined in the checklist, with the base document and providing the specification online for viewing and/or editing are the same as described with the first embodiment.

The specification-writing services according to the method of the present invention are provided to the client in a number of ways. In all embodiments, the client is provided with a secure online client account, can view the automatically-generated project specification online, and can interact in real-time with the specification writer and other participants of the construction project who have access to the client account online, *i.e.*, as soon as the specification is amended and “saved”, it is viewable by all participants online. In a further development of the Preferred

Embodiment, the client contracts for access to the relational database, receives the necessary Internet browser plug-ins for the specification editor and generates his or her own project specification. The client may use the checklist to generate the relevant user tags or may have access to the calloff link and CAD viewer, scan the drawing for the calloffs, and generate the
5 editable project specification. In both of these cases, the service is offered as a type of do-it-yourself service and the client in effect becomes the specification writer.

BRIEF DESCRIPTION OF THE DRAWINGS

- FIG. 1A** depicts a section of a construction drawing showing some of the calloffs on the drawing (prior art).
- FIG. 1B** shows a calloff list according to the invention.
- FIG. 2** is a breakdown of the divisions of a standard base document, showing a few of the sections for the various divisions (prior art).
- FIG. 3** is a diagram showing a drawing mappings table, a dictionary table and an ignore bin.
- FIG. 4A** is a diagram showing system tags with a tag ID and a parent ID.
- FIG. 4B** is a diagram showing the mapping of a tag to a section and a paragraph of the base document.
- FIG. 4C** lists the first few paragraphs in Section 02780 – *Unit Pavers* and shows the paragraph ID assigned to each paragraph.
- FIG. 5** shows the decision tree when associating a user tag with system default tags and binding the user tag in a dictionary for future application.

FIG. 6 illustrates the process of merging the relational database with the base document database and the process of mapping the user tag to the relevant sections and paragraphs.

FIG. 7 shows a checklist provided in an online checklist service.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method of automatically generating a project specification **PS1** online, based on a base document **B**, and providing a client with online, real-time access to the project specification **PS1**. The base document **B** is a complete, unedited specification that contains all specifications for any element or product that is generally approved for use in construction. In the description that follows, the base document **B** referred to is a standard specification, although it should be understood that this document can be a document that has been generated previously for the same or for another client and is now used as a default client master document **CMaster**. The divisions and some of the sections and paragraphs of the base document **B** are shown in **FIG. 2** to illustrate the structure of the document and to serve as an aid in describing the method according to the present invention.

The standard base document **B** is stored in a base document database **DB0**, which, in the Preferred Embodiment is a LOTUS NOTES® database. A client database **DB1** is a document database file that contains the current client project of a Client **C1**. This client database **DB1** may also contain the client master document **CMaster** and/or one or more client documents previously generated for other projects for the client that may be used as default documents for subsequent projects. Additional client database files **DB2**, **DB3**, ... are provided for additional Clients **C2**, **C3**, The client database **DB1** is accessible to the Client **C1** online from a remote location via the Internet.

As can be seen in **FIG. 2**, the base document **B** consists of 16 divisions **01 ... 16**, with each division having a number of sections identified by a five-digit code, such as *Section 02780 – Unit*

Pavers. Only a few sections are shown in FIG. 2 for each division, as an illustration of the structure of the standard base document **B**. Since the example used throughout this description will be taken from the Section 02780 – Unit Pavers, this section is shown in greater detail.

The heart of the method lies in a relational database **SQL-DB** that contains data that maps a user tag **UT** to a system default tag **ST** and then to the relevant paragraphs in the base document **B**. Before a project specification can be automatically generated, a dictionary of “system default tags” is created. Each section has a section code **SECTION-ID** and, in the example used herein, the **SECTION-ID** for *Unit Pavers* is 02780. Each paragraph of the base document **B** is reviewed and one or more system default tags **ST** are associated with each particular section and paragraph that is project relevant. Several examples of system default tags **ST** are shown in a System Tags Table **T2** in FIG. 4A. Some paragraphs in the base document **B** are general paragraphs that are required for all project specifications and are identified as to be included in all project specifications and may or may not require a system default tag. The system default tag **ST** is associated with the particular section and paragraph by assigning a unique system tag identifier **TAG-ID** to each system default tag **ST**. The System Tags Table **T2** shown in FIG. 4A lists several system default tags **ST**, each with a unique system tag identifier **TAG-ID**. The method according to the invention also defines a parent/child relationship for each system default tag **ST**. For example, as can be seen by reviewing the breakdown of SECTION 02780 – *Unit Pavers* in FIG. 2 and System Tags Table **T2** in FIG. 4A, *Unit Pavers* has a **TAG-ID** of 221 and a **PARENT-ID** of 0. *Brick pavers* has a **TAG-ID** of 553 and a **PARENT-ID** of 221, indicating that system default tag *Unit Pavers* 221 is a parent to system default tag *Brick pavers* 553.

The system tag identifiers **TAG-ID** are “mapped” to the particular sections of the base document **B**. FIG. 4C shows a mapping example of the first few paragraphs of SECTION 02780 – *Unit Pavers* in which the paragraphs are assigned a **PARAGRAPH-ID**. As can be seen in FIG. 4C, Division 02, the section 02780 starts with **PARAGRAPH-ID** of 1, and all paragraphs within that section are numbered sequentially. FIG. 4B shows a portion of a Mappings Table **T3** that illustrates the relationship between the **PARAGRAPH-ID**, the **SECTION-ID**, the **TAG-ID**, and a mapping identifier **MAP-ID**. The mapping function of the **SQL-DB** will be discussed below when describing the process of generating a project specification.

In the Preferred Embodiment of the method, the project specification **PS1** for Client **C1** is automatically generated from calloffs on a CAD drawing. **FIG. 1A** shows a section of a construction drawing **A** containing several typical calloffs **10** for building and site elements required in a construction project. In this embodiment, the drawing **A** is a CAD drawing from Client **C1** that is loaded into a conventional CAD viewer, such as AUTODESK VOLOVIEW and scanned for calloffs and other elements on the CAD drawing that can include text, keynotes, embedded objects, and symbols. The CAD viewer interfaces with a calloff link that is based on an algorithm which takes the real world X/Y coordinates from the CAD system and converts them to the pixel coordinate system of a computer monitor. As the viewer pans across or zooms in on portions of the CAD drawing, the calloffs and other elements on the portion of the drawing that appears in the viewer are presented in a pop-up dialog box Calloff List **CL**, shown in **FIG. 1B**. The calloff link knows the location of the viewer on the drawing and can match the location of the particular calloffs shown on the screen with the CAD X/Y coordinates of the drawing.

The example of the calloff **10A**, *brick pavers on sand*, shown in **FIG. 1A**, will be used to illustrate the method. As can be seen in **FIG. 2**, the calloff *brick pavers on sand* **10A** does not appear in precisely that form in Section 02780 – Unit Pavers, which includes such pavers as *brick pavers*, *concrete pavers*, *asphalt pavers*, and *stone pavers*. The Calloff List **CL** in **FIG. 1B** shows the calloffs that appear on the screen when the viewer displays the section of the drawing **A** shown in **FIG. 1A**. Data from calloffs that have been previously scanned and incorporated into the **SQL-DB** are shown in **FIG. 3**. For example, *aluminum windows* with a TAG-ID of **805** is shown in a Dictionary **T5**, and *100 Commercial Street* is shown in an Ignore Bin **T6**, with project name *All*, indicating that this particular calloff is to be ignored on all projects when generating specifications. **FIG. 3** also shows a Drawings Mappings Table **T7** which lists, among other information, the calloffs in the drawing, the X/Y coordinates of the calloff, a Flag **F**, and a Project Name. When a calloff appears in the Calloff List **CL**, the drawing mappings function of the **SQL-DB** checks in the Dictionary **T5** to see if the calloff is already there and, if it is, inserts a value for the Flag **F** that identifies the calloff as a scanned tag. If the calloff is not found in the Dictionary **T5**, the mappings function checks an Ignore Bin **T6** to see if the calloff is listed as a user tag to be ignored and, if it is, inserts a value for the Flag **F** in the Drawing Mappings Table **T7** that identifies the calloff as an ignore tag. If the calloff is not found in either of these tables, the drawing mappings function inserts a value for the Flag **F** that indicates that the calloff is an

unscanned tag. Looking now at the Calloff List CL shown in FIG. 1B, the calloff for *aluminum windows* is identified as a known or scanned tag with a SCANNED icon, and *100 Commercial Street* is identified as an ignore tag with an IGNORE icon. The rest of the calloffs, including *brick paver on sand* are marked as unknown or unscanned tags with an UNSCANNED icon. The icons serve as visual cues as to the status of the respective calloffs and can be color-coded to effectively signal a scanned, unscanned, or ignore status.

FIG. 5 illustrates the process of associating the user tag *brick pavers on sand* with the system default tag for *sand*. A full-text search of the base documents in the document management database is carried out, using, for example, the term *brick pavers*. The SECTION-IDs and corresponding section names in which *brick pavers* occurs now appear listed on the screen in a dialog box. The specification writer, knowing from the context of the drawing that the calloff *brick pavers on sand* pertains to Unit Pavers, and not to Unit Masonry, or Brick Flooring, selects *02780 Unit Pavers*. *Unit Pavers* is then further broken down into *brick, concrete, asphalt, stone*. *Brick* is further broken down into substrates such as *sand, bituminous, mortar*. By selecting the system default tag *sand*, the calloff *brick pavers on sand* is stored in the User Tags Table T1 as the user tag *brick pavers on sand* with the TAG-ID 600 that corresponds to *sand aggregate* in SECTION 02780. The person scanning the drawing now has the opportunity to “bind” the user tag *brick pavers on sand* with the system default tag *sand* with TAG-ID 600, i.e., to associate the user tag with the system default tag TAG-ID 600 for all project specifications in the future, or to associate the user tag for this project specification only, or for this client only. The user tag is identified accordingly in the Dictionary T5 and will be recognized in future scans as a known user tag. The Dictionary T5 contains all tags or abbreviations, including system default tags ST and user tags that have been associated with a system default tag ST. These tags can be coded for general use or for a particular client or project. For example, tags that are generally applicable for all clients can be assigned a general code such as 0, and tags used by the individual clients can be assigned unique client ID codes.

As time goes on and Client C1 continues to submit drawings for subsequent projects, the number of “unscanned” or “unknown” user tags appearing in the Calloff List CL will decrease and less and less effort will be required on the part of the specification writer to associate user tags with system default tags ST.

When the steps of associating all the user tags have been completed, the user tag data for the particular project can be linked with the Mappings Table **T3** and the Sections Table **T0** to map the relevant paragraphs of the base documents required for this project specification **PS1**. Continuing with our example of *brick pavers on sand*, this user tag was associated with *sand* in SECTION 02780 with *sand aggregate* **TAG-ID 600**, which is placed in the User Tags Table **T1** and identified as relevant to project specification **PS1**. It can be seen in the System Tags Table **T2** in **FIG. 4A**, that *sand aggregate* **TAG-ID 600** has a parent *brick pavers* with **TAG-ID** of **533** which is also placed in the User Tags Table **T1** and identified as relevant to project specification **PS1**. Looking again in the System Tags Table **T2**, it can be seen that **TAG-ID 533** has a parent *Unit Pavers* with **TAG-ID 221**. *Unit Pavers* is also placed in the User Tags Table **T1** with the appropriate association with **PS1**. *Unit Pavers* has a **PARENT-ID** of **0**, shown in **FIG. 4A**, which indicates that it has no parent. Thus, a complete map of the sections and paragraphs required for the project specification **PS1** is generated in the **SQL-DB** for the user tag *brick pavers on sand* by inserting the lowest level association of a user tag into the User Tags Table **T1** and extracting parent paragraph information from the Systems Tag Table **T0**. As can be seen in the Mappings Table **T3** in **FIG. 6**, each **TAG-ID** has associated with it the **SECTION-ID** and the relevant **PARAGRAPH-ID**.

The **SQL-DB** and the base document **B** are then merged to generate the project specification **PS1**. As shown schematically in **FIG. 6**, the complete base document **B** is pulled up from the document management database **DB0** and merged with the **SQL-DB**. The User Tags Table **T1** defines the user tags that are required for the particular project specification **PS1** and extracts the relevant sections information from the Sections Table **T0**. The mappings function in the **SQL-DB** determines which paragraphs in the base document **B** are irrelevant, based on the information in the User Tags Table **T1** and are to be crossed out when the project specification **PS1** is sent to the editor. In the Preferred Embodiment, the newly generated project specification **PS1**, as it appears online for editing and viewing, shows all the paragraphs of the base document **B**, whereby those paragraphs that are irrelevant to the particular project are crossed-out.

Once the newly generated project specification **PS1** is saved, it is immediately viewable and editable online. Client **C1**, including all participants in the construction project who have access to the client account, can now review the project specification **PS1** and incorporate

comments or requests for changes to the specification in a related project notes database file that is provided in the Client Account.

In an alternative embodiment, a Checklist, shown in Fig. 7, is provided online for the client to fill out. The Checklist is organized commensurate with the divisions and sections contained in the particular base document and contains a list of tags in each section that can be checked off. A unique field note is associated with each check box that relates the box to a particular system default tag ST. In this alternative embodiment, the Checklist is not a relational database, but is simply a static table. A look-up procedure links the checked field notes in the checklist with the respective tags in the System Tags Table T2. Information from the System Tags Table T2 is linked to the User Tags Table T1 and the procedure for generating the project specification PS1 is analogous to that of the Preferred Embodiment as of the point when the user tags for the particular project have been inserted into the User Tags Table T1.

Common to both embodiments is that the project specification PS1 is available for viewing online via the Internet to project participants located at remote sites via a client account. In a further development of the Preferred Embodiment, Client C1, after opening an account with the specification writing service, receives access to the specification database SQL-DB, the base documents, the CAD scanning functions, and the editor and can generate his or her own project specification and edit it online. When the project specification is ready for printing, it is downloaded to a file in the client's computer in standard wordprocessor formats such as MS Word®, WordPerfect®, rich text format, etc. Client C1 can continue to modify the project specification by wordprocessor, if so desired.

The embodiments mentioned herein are merely illustrative of the present invention. It should be understood that variations in construction and installation of the present invention may be contemplated in view of the following claims without straying from the intended scope and field of the invention herein disclosed.

What is claimed is:

1 **1.** A method of automatically generating a project specifications from project information,
2 wherein said project specification is based on a base document, said method comprising the steps
3 of:

- 4 a) creating a map of a base document;
5 b) defining default tags for said base document;
6 c) mapping said default tags to said base document;
7 d) creating user tags from said project information;
8 e) linking said user tags to said default tags to create a project specification map; and
9 f) merging said base document and said project specification map to create a project
10 specification.

1 **2.** The method of Claim 1, wherein said step of creating said map of said base document
2 includes defining each paragraph in said base document and assigning a unique paragraph
3 identifier to said each paragraph.

1 **3.** The method of Claim 2, wherein said step of linking said user tags to said default tags
2 includes

- 3 a) assigning a unique tag identifier to each of said default tags;
4 b) for each of said user tags, identifying a corresponding default tag for each particular user
5 tag and linking said particular user tag to said default tag.

1 **4.** The method according to claim 3, wherein said step of merging said base document and
2 said project specification map to create said project specification includes the steps of:

- 3 a) calling up said base document and said project specification map;
4 b) merging said base document and said specification map;
5 c) determining which paragraphs are relevant paragraphs to said project specification and
6 which are irrelevant; and
7 d) crossing out all said irrelevant paragraphs in said base document

1 **5.** The method of Claim 4, wherein said project information is in a form of drawing calloffs

on a CAD drawing, said CAD drawing being viewable on a computer screen via a CAD viewer, said method further comprising the steps of:

- a) providing a calloff link between a CAD drawing and a CAD viewer. wherein said calloff link converts X/Y coordinates of said CAD drawing to pixel coordinates of a computer screen;
- b) providing a drawing mapping function that presents calloffs from said CAD drawing in a calloff list and identifies a calloff as a scanned calloff if said calloff is found in a first list, identifies said calloff as an ignore calloff if said calloff is found in a second list, and identifies said calloff as an unknown calloff if said calloff is not found in one of said first and said second lists;
- c) inserting said corresponding one of said default tags into a user tag list.

6. The method of Claim 4, wherein said project information is obtained from a checklist that is filled out online, said method further comprising the steps of:

- a) providing a client account online;
- b) providing a project information checklist online wherein default tags can be checked off online; and
- c) linking said default tags that were checked off in said checklist with said default tags.

ABSTRACT

Method of automatically generating a construction specification that is immediately viewable and editable online. Construction project information can be automatically extracted from a CAD drawing or from a checklist that is filled out online, and a project specification based on standardized base documents can be generated that is viewable and editable online, in real-time. When viewing the project specification in an editor, the relevant paragraphs appear in normal print, while all irrelevant paragraphs appear crossed out. The method of offering specification writing services via the Internet allows project participants at various remote locations to share information and to view and edit the project specification online in real-time.

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Division List

FIG. 2

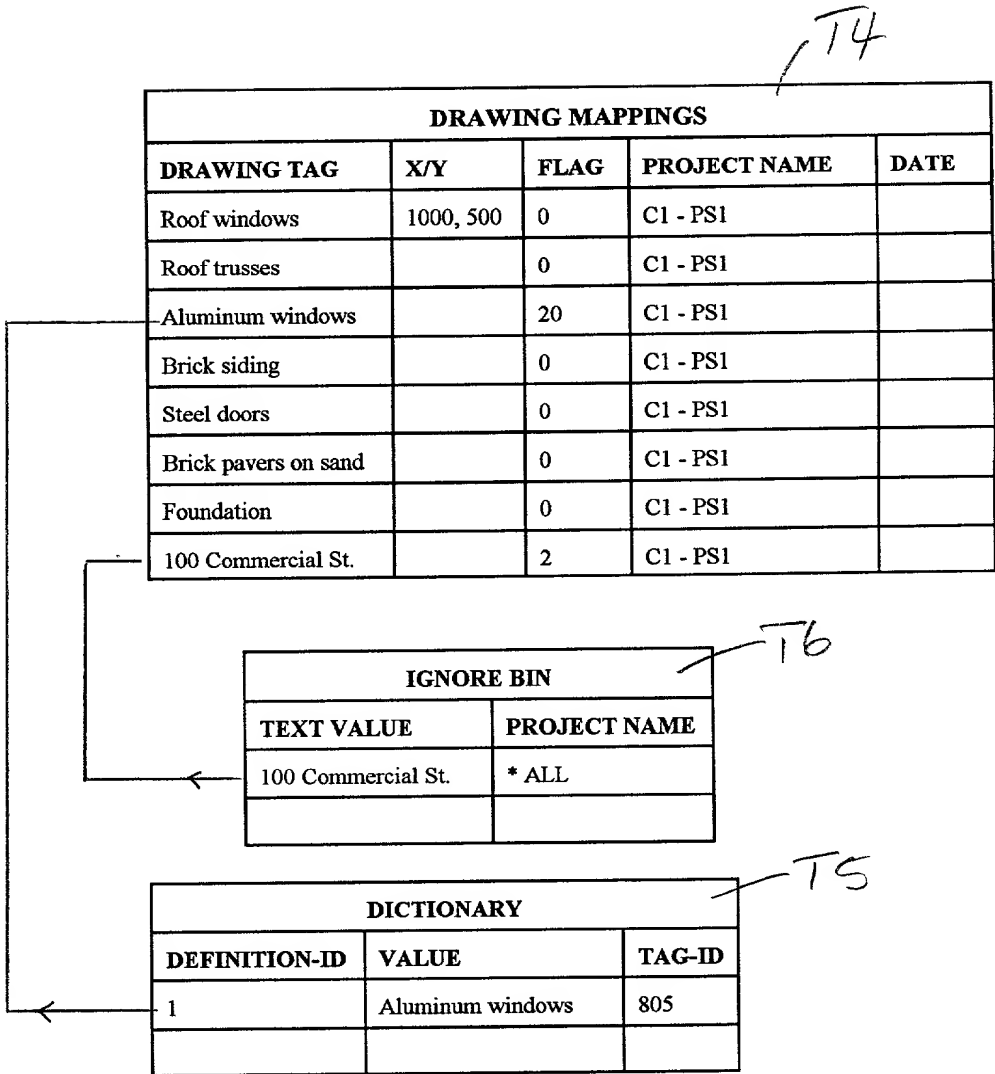


FIG. 3

13

FIG. 4A

12

SYSTEM TAGS TABLE		
TAG-ID	TAG	PARENT-ID
221	Unit Pavers	0
553	Brick Pavers	221
554	Concrete Pavers	221
555	Asphalt Pavers	221
556	Stone Pavers	221
600	Sand Aggregate	553
601	Bituminous	553
602	Mortar	553
603	Sand Aggregate	554
604	Bituminous	555
605	Mortar	556

FIG. 4A

ST

MAPPINGS TABLE			
MAP-ID	TAG-ID	SECTION-ID	PARAGRAPH-ID
1000	221	02780	1
1001	221	02780	2
1002	221	02780	3
1003	221	02780	4
1004	600	02780	7
1005	603	02780	8
1006	601	02780	9
1007	604	02780	10
1008	602	02780	11
1009	605	02780	12
1010	221	02780	13
1011	553	02780	16
1012	554	02780	17
1013	555	02780	18
1014	556	02780	19
1015	601	02780	20

FIG. 4B

	PARAGRAPH-ID
02 SITEWORK	1
SECTION 02780 - UNIT PAVERS	1
PART 1 GENERAL	2
1.1 Related Documents	3
A. Drawing and general provisions ...	4
1.2 Summary	5
A. This section includes ...	6
1. Brick pavers set in aggregate setting bed	7
2. Concrete pavers set in aggregate setting bed	8
3. Brick pavers set in bituminous setting bed	9
4. Asphalt block pavers set in bituminous setting bed	10
5. Brick pavers set in mortar setting bed	11
6. Rough stone pavers set in mortar setting bed	12
7. Edge restraints for unit pavers	13
1.3 Submittals	14
A. Product data for the following:	15
1. Brick pavers	16
2. Concrete pavers	17
3. Asphalt pavers	18
4. Stone pavers	19
5. Bituminous setting materials	20
...	
1.4 Quality Assurance	30
...	
1.5 Delivery, Storage, and Handling	46
...	
1.6 Project Condition	51
...	

FIG. 4C

CL

CALLOFF LIST	
?	Roof Windows
?	Roof Trusses
✓	Aluminum Windows
?	Brick Siding
?	Steel Doors
?	Brick Pavers on Sand
?	Foundation
×	100 Commercial St.

Full Text Search of
Document Database
DB0

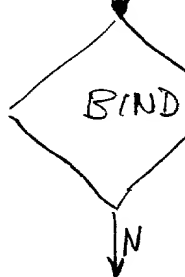
<input checked="" type="checkbox"/>	02780	Unit Pavers
<input type="checkbox"/>	04810	Unit Masonry
<input type="checkbox"/>	09635	Brick Flooring

<input checked="" type="checkbox"/>	Brick
<input type="checkbox"/>	Concrete
<input type="checkbox"/>	Asphalt
<input type="checkbox"/>	Stone

<input checked="" type="checkbox"/>	Sand
<input type="checkbox"/>	Bituminous
<input type="checkbox"/>	Mortar

TI

USER TAGS (PROJECT)		
TAG	TAG-ID	PROJ. NAME
Brick paver on sand	600	C1 - PS1



DICTIONARY	
VALUE	TAG-ID
Brick paver on sand	600

GET NEXT CALLOFF

SYSTEM TAGS TABLE		
TAG-ID	TAG	PARENT-ID
221	Unit Pavers	0
553	Brick Pavers	221
554	Concrete Pavers	221
555	Asphalt Pavers	221
556	Stone Pavers	221
600	Sand Aggregate	553
601	Bituminous	553
602	Mortar	553
603	Sand Aggregate	554
604	Bituminous	555
605	Mortar	556

USER TAGS TABLE	
TAG	TAG-ID
Brick pavers on sand	600
Brick pavers	553
Unit Pavers	221

MAPPINGS TABLE		
TAG-ID	SECTION-ID	PARAGR-ID
600	02780	7, etc.
553	02780	16 etc.
221	02780	1,2,3,4,7,8, ...

RETRIEVE FROM SQL-DB

Cross out paragraphs
Renumber paragraphs
Display in editor

Go to Output

FIG. 6

ONLINE CHECKLIST

☐ - 01410 Inspection and Testing Requirements

- ☐ - This section required for projects in Massachusetts with structural work
- ☐ - Testing agency paid for by Owner
- ☐ - Testing agency paid for by Contractor

☐ - 01630 Substitution Request Form (always use this section)

DIVISION 2 - SITE WORK

☐ - 02050 Demolition

- ☐ - Demolition of entire building
- ☐ - Selective demolition at portions of exterior
- ☐ - Selective demolition at portions of interior
- List: ☐
- ☐ - Items to be salvaged or reinstalled: ☐
- ☐ - Asbestos and lead removed under prior contract

☐ - 02100 Site Preparation

☐ - 02140 Dewatering

☐ - 02160 Excavation Support System

☐ - 02200 Earthwork

- ☐ - Excavation and compaction at site
- ☐ - Excavation and compaction under building

☐ - 02270 Slope Protection and Erosion Control

☐ - 02282 Termite Control

☐ - 02360 Driven Piles

☐ - 02380 Caissons

☐ - 02511 Hot-Mixed Asphalt Paving

- ☐ - Roadways
- ☐ - Sidewalks
- ☐ - Parking Areas
- ☐ - Driveways
- ☐ - Curbs and Gutters

☐ - 02515 Unit Pavers

- ☐ - Brick
- ☐ - Concrete
- ☐ - Pavers on concrete slab
- ☐ - Pavers on bituminous setting bed

FIG. 7

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PTO/SB/01 (12-97)

Approved for use through 9/30/00. OMB 0651-0032

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	00-93
	First Named Inventor	Gilles L. Letourneau
	COMPLETE IF KNOWN	
	Application Number	/
	Filing Date	
	Group Art Unit	
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	OR	<input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD OF AUTOMATICALLY GENERATING SPECIFICATIONS AND PROVIDING ONLINE SERVICES FOR SAME

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)

☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☒ Customer Number 24124 OR ☐ Registered practitioner(s) name/registration number listed below

Place Customer Number Bar Code Label here

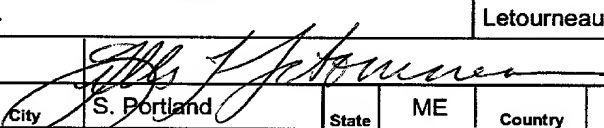
Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.


Direct all correspondence to: ☒ Customer Number or Bar Code Label 24124 OR ☐ Correspondence address below

Name					
Address					
Address					
City		State		ZIP	
Country		Telephone		Fax	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor:		<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle (if any))		Family Name or Surname			
Gilles L.		Letourneau			
Inventor's Signature				Date	11/10/00
Residence: City	S. Portland	State	ME	Country	US
Post Office Address	180 Mussey Street				
Post Office Address					
City	S. Portland	State	ME	ZIP	04106
				Country	

☒ Additional inventors are being named on the 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto

Please type a plus sign (+) inside this box → 

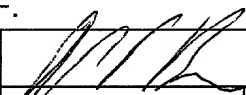
PTO/SB/02A (3-97)
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DECLARATION

ADDITIONAL INVENTOR(S) Supplemental Sheet

Page 1 of 1

Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle [if any])				Family Name or Surname			
Michael F.				Brennan			
Inventor's Signature				Date	11/10/00		
Residence: City	Falmouth	State	ME	Country	US	Citizenship	US
Post Office Address							
Post Office Address	13 Andersen Drive						
City	Falmouth	State	ME	ZIP	04105	Country	US
Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle [if any])				Family Name or Surname			
Inventor's Signature				Date			
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	
Name of Additional Joint Inventor, if any:				<input type="checkbox"/> A petition has been filed for this unsigned inventor			
Given Name (first and middle [if any])				Family Name or Surname			
Inventor's Signature				Date			
Residence: City		State		Country		Citizenship	
Post Office Address							
Post Office Address							
City		State		ZIP		Country	

Burden Hour Statement: This form is estimated to take 0.4 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.